Data Acquisition

CYDAS 16JRHRU

PCI Data Acquisition Board - 16 Channels of 100kHz 16-bit A/D, 8 DIO

USER'S MANUAL

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CyberResearch®, Inc.

www.cyberresearch.com

25 Business Park Dr., Branford, CT 06405 USA

203-483-8815 (9am to 5pm EST) FAX: 203-483-9024

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About this User's Guide

What you will learn from this user's guide

This user's guide explains how to install, configure, and use the CYDAS 16JRHRU so that you get the most out of its analog, digital, and counter I/O features.

This user's guide also refers you to related documents available on our web site, and to technical support resources.

Conventions in this user's guide

For more information on …

Text presented in a box signifies additional information and helpful hints related to the subject matter you are reading.

Caution! Shaded caution statements present information to help you avoid injuring yourself and others, damaging your hardware, or losing your data.

<#:#> Angle brackets that enclose numbers separated by a colon signify a range of numbers, such as those assigned to registers, bit settings, etc.

bold text **Bold** text is used for the names of objects on the screen, such as buttons, text boxes, and check boxes. For example:
1. Insert the disk or CD and click the **OK** button.

italic text *Italic* text is used for the names of manuals and help topic titles, and to emphasize a word or phrase. For example:
The *Insta*Cal® installation procedure is explained in the *Quick Start Guide*.
Never touch the exposed pins or circuit connections on the board.

Introducing the CYDAS 16JRHRU

Overview: CYDAS 16JRHRU features

This manual explains how to install and use the CYDAS 16JRHRU board. The CYDAS 16JRHRU is a multifunction measurement and control board designed to operate in computers with PCI accessory slots. This board can be used for applications such as data acquisition, system timing, and industrial process control.

The CYDAS 16JRHRU provides the following features:

- Eight differential or 16 single-ended analog inputs
- 16-bit A/D resolution
- 100 kHz sample rate
- Eight TTL-compatible digital I/O channels
- Three 16-bit down counters
- 37-pin high density I/O connector
- Universal PCI bus (3.3V/5V 32-bit 33 MHz)

The analog input mode is switch-selectable for eight differential or 16 single-ended analog inputs. Analog input ranges are selectable with software as bipolar or unipolar. Bipolar input ranges are ±10V, ±5V, ±2.5V and ±1.25V. Unipolar input ranges are 0 to 10V, 0 to 5V, 0 to 2.5V and 0 to 1.25V.

The CYDAS 16JRHRU board is equipped with an 82C54 counter chip. This chip contains three 16-bit down counters that provide clock, gate, and output connections.

Software features

For information on the features of *Insta*Cal and the other software included with your CYDAS 16JRHRU, refer to the *Quick Start Guide* that shipped with your device.

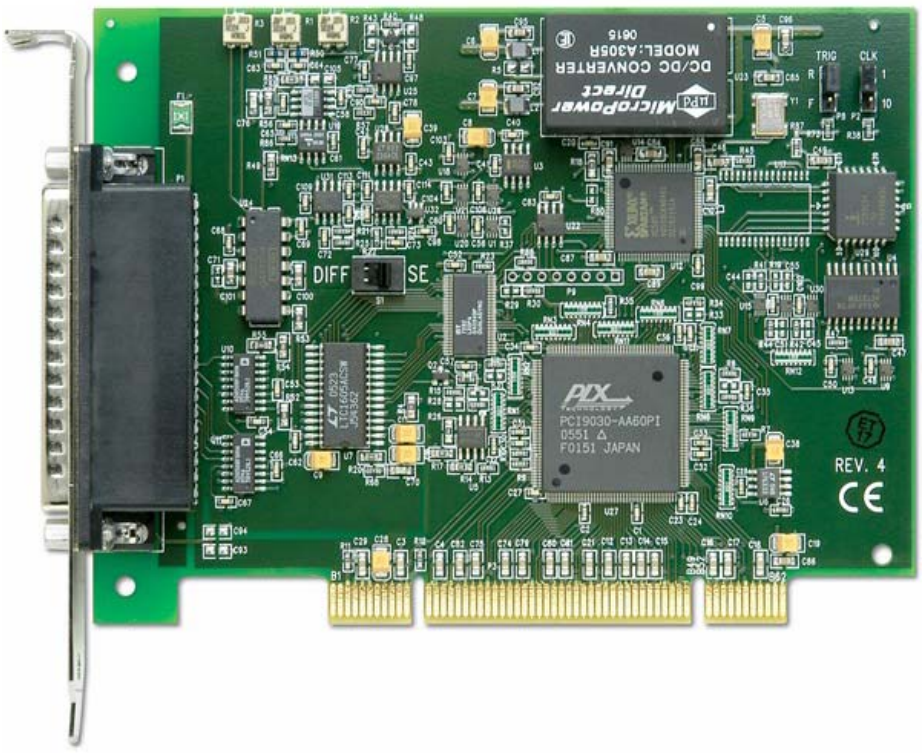
Installing the CYDAS 16JRHRU

What comes with your CYDAS 16JRHRU shipment?

The following items are shipped with the CYDAS 16JRHRU.

Hardware

- CYDAS 16JRHRU



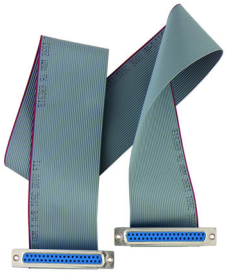
Additional documentation

In addition to this hardware user's guide, you should also receive the *Quick Start Guide* (available in PDF at .on the CD accompaning your device. This booklet supplies a brief description of the software you received with your CYDAS 16JRHRU and information regarding installation of that software. Please read this booklet completely before installing any software or hardware.

Optional components

If you ordered any of the following products with your board, they should be included with your shipment.

- Cables



CBL 3702

CBL 37xxFS

- Signal termination and conditioning accessories

  We provide signal termination products for use with the CYDAS 16JRHRU. Refer to the "Field wiring, signal termination and signal conditioning" section on page 2-7 for a complete list of compatible accessory products.

Unpacking the CYDAS 16JRHRU

As with any electronic device, you should take care while handling to avoid damage from static electricity. Before removing the CYDAS 16JRHRU from its packaging, ground yourself using a wrist strap or by simply touching the computer chassis or other grounded object to eliminate any stored static charge.

If any components are missing or damaged, notify CyberResearch, Inc. immediately by phone, fax, or e-mail:

- Phone: 203-483-9966 and follow the instructions for reaching Tech Support.
- Fax: 203-483-9024 to the attention of Tech Support
- Email: techsupport@cyberresearch.com

Installing the software

Refer to the *Quick Start Guide* for instructions on installing the software on the *sofware CD. Acquisition Software CD*.

Configuring the CYDAS 16JRHRU

The CYDAS 16JRHRU board has one switch and two jumpers mounted on it. Before installing the CYDAS 16JRHRU in the computer, verify that the board is configured with the settings that you want. Factory default settings are listed in Table 2-1.

Table 2-1. Switch/jumper factory-configured defaults

Board label	Switch/jumper description	Default setting
S1	Channel mode switch	8 channel (diff)
P8	A/D Trigger edge jumper	Rising edge
P2	Clock frequency jumper	1 MHz

The locations of each switch and jumper are shown in Figure 2-1.

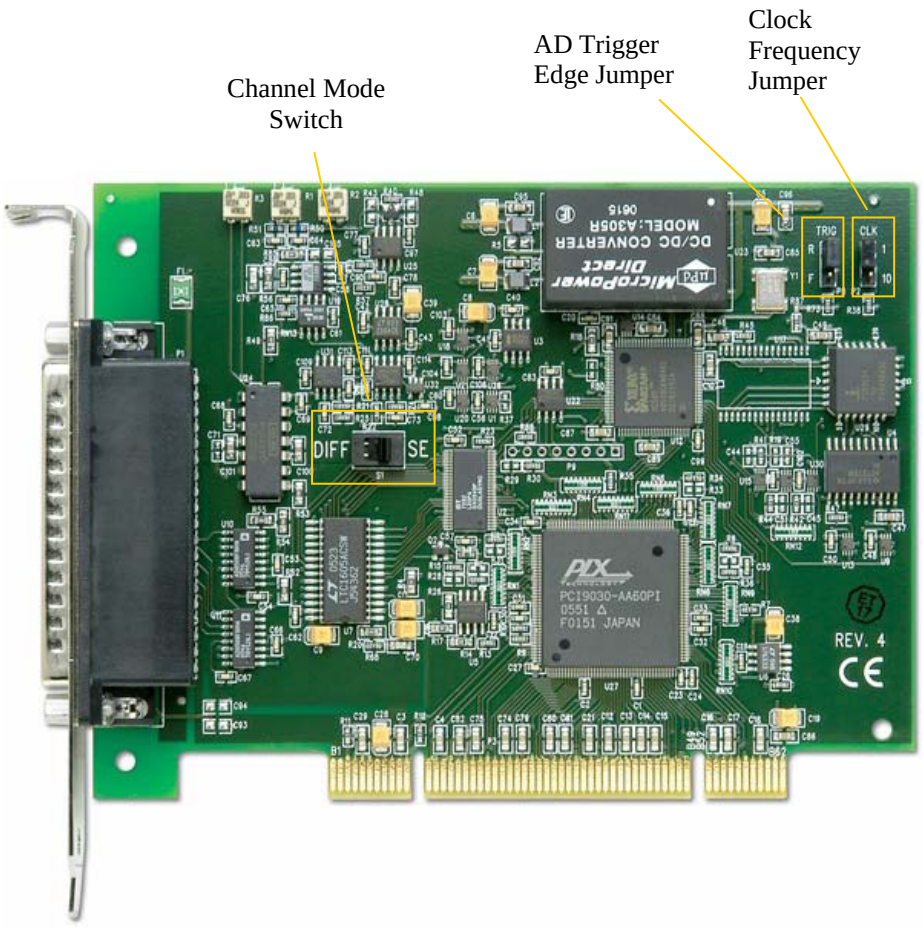


Figure 2-1. CYDAS 16JRHRU switch and jumper locations

Instructions on how to change the configuration of each jumper and switch are shown on the following pages.

Channel mode switch

Switch **S1** configures the analog inputs of the CYDAS 16JRHRU as either eight differential channels or 16 single-ended channels. Set the switch to single-ended mode if you have more than eight analog inputs to sample. Setting the switch to differential mode allows up to 10 volts of common mode (ground loop) rejection and provides better noise immunity.

The channel mode switch is factory-configured for eight differential inputs (see Figure 2-2.) To configure for 16 single-ended channels, set this switch to "**SE**".

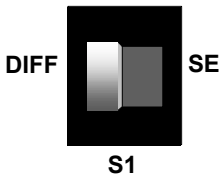


Figure 2-2. Channel mode switch

A/D trigger edge jumper

Jumper **P8** configures the edge to initiate the A/D conversion with. The options are either rising or falling edge. The A/D trigger edge jumper is factory-configured for rising edge. Figure 2-3 shows the jumper position for each configuration option.

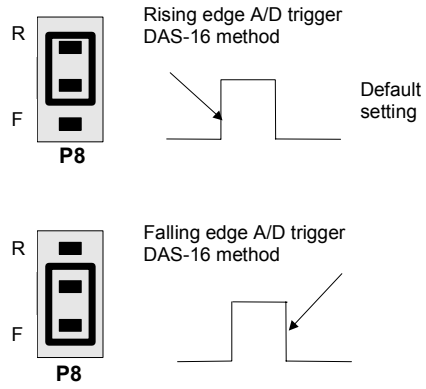


Figure 2-3. A/D trigger edge jumper

For compatibility with all third-party packages, DAS-16 software, and CYDAS 16JRHRU software, leave this jumper set to the default rising edge position.

If you are using the CYDAS 16JRHRU board in an application that is designed for compatibility with the Keithley MetraByte DAS-1600 board, configure the trigger edge jumper for falling edge.

Clock frequency jumper

Jumper **P2** configures the frequency of the square wave that is used as a clock by the A/D pacer circuitry. This pacer circuitry controls the sample timing of the A/D.

You can configure the frequency for 10 MHz or 1 MHz. The clock frequency jumper is factory-configured for 1 MHz, as shown in Figure 2-4.

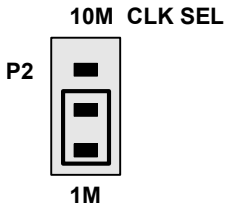


Figure 2-4. Clock frequency jumper

Configure this jumper for 10 MHz, unless you have reason to do otherwise.

The internal pacer output is also available at pin 20

The internal pacer output that drives the A/D converter is also available at pin 20 (CTR 3 Output) on the board's main I/O connector (see Figure 2-5).

Installing the CYDAS 16JRHRU

After you configure the board's switches and jumpers, install the CYDAS 16JRHRU into your computer. To install your board, follow the steps below:

Install the DAQ software before you install your board

The driver needed to run your board is installed with the DAQ software. Therefore, you need to install the DAQ software before you install your board. Refer to the *Quick Start Guide* for instructions on installing the software.

1. Turn your computer off, open it up, and insert your board into any available PCI slot.
2. Close your computer and turn it on.

   If you are using an operating system with support for plug-and-play (such as Windows 2000 or Windows XP), a dialog box pops up as the system loads indicating that new hardware has been detected. If the information file for this board is not already loaded onto your PC, you will be prompted for the disk containing this file. The DAQ software contains this file. If required, insert the software CD and click **OK**.
3. To test your installation and configure your board, run the *Insta*Cal utility installed in the previous section. Refer to the *DAQ Software Quick Start* that came with your board for information on how to initially set up and load *Insta*Cal.

Board configuration with *Insta*Cal

If you change the board configuration with *Insta*Cal, you may have to also physically change the setting of a corresponding switch or jumper on the board. Refer to Default hardware configuration on page 2-2 for specific jumper and switch information.

Allow your computer to warm up for at least 15 minutes before acquiring data. The high speed components used on the board generate heat, and it takes this amount of time for a board to reach steady state if it has been powered off for a significant amount of time.

Connecting the board for I/O operations

Connectors, cables – main I/O connector

Table 2-2 lists the board connectors, applicable cables, and compatible accessory products for the CYDAS 16JRHRU.

Table 2-2. Board connectors, cables, accessory equipment

Connector type	37 pin male "D" connector
Connector compatibility	Identical to the CYDAS 16JRHR connector
Compatible cables	CBL 370x (Figure 2-6) CBL 37xxFS (Figure 2-7)
Compatible accessory products (with the CBL 37xx cable or CBL 37xxFS cable)	CYST 37 CYSTP 372P CYSSH 16

The CYDAS 16JRHRU board's main I/O connector is a 37-pin "D" connector that is accessible from the rear of the PC on the expansion back plate. This connector accepts female 37-pin D-type connectors, such as the CBL 370x 37-pin cable (Figure 2-6) or the CBL 37xxFS 37-pin shielded cable (Figure 2-7).

Analog connections and configuration

General information on analog signal connections and configuration is contained in the *Guide to Signal Connections* .

Pin out – main I/O connector

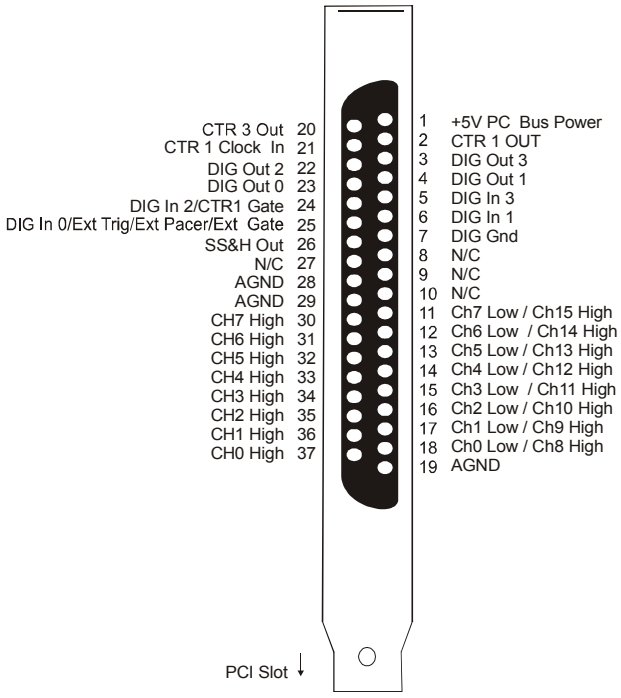


Figure 2-5. Main I/O connector

Cabling

You can use the CBL 37xx or CBL 37xxFS 37-pin cable to connect signals to the CYDAS 16JRHRU board.

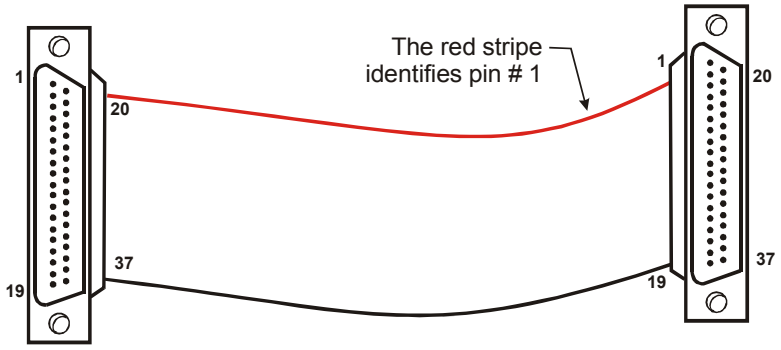


Figure 2-6. CBL 37xx cable

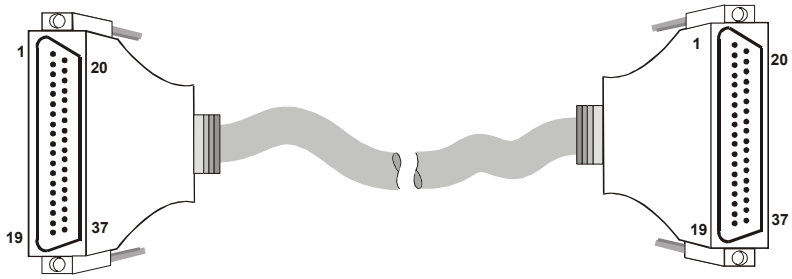


Figure 2-7. CBL 37xxFS cable

Field wiring, signal termination, and signal conditioning

You can use the following screw terminal boards to terminate field signals and route them into the CYDAS 16JRHRU board using a CBL 37xx cable or a CBL 37xxFS cable:

- **CYST 37** – 4 x 4, 37-pin screw terminal board.
- **CYSTP 372P** – 37-conductor, shielded signal connection/screw terminal box that provides two independent 37-pin connections.

For analog signal conditioning, the following signal conditioning board is compatible with the CYDAS 16JRHRU board.

- **CYSSH 16** – 16-channel sample & hold front end board (four channels installed). Details on this product are available from our web site.

Programming and Developing Applications

After following the installation instructions in Chapter 2, your board should now be installed and ready for use. Although the board is part of the larger DAS family, in general there may be no correspondence among registers for different boards. Software written at the register level for other DAS models will not function correctly with your board.

Programming languages

CyberResearch's Universal Library™ provides access to board functions from a variety of Windows programming languages. If you are planning to write programs, or would like to run the example programs for Visual Basic® or any other language, please refer to the *Universal Library User's Guide* (available on our web site.

Packaged applications programs

Many packaged application programs, such as SoftWIRE® and HP-VEE™, now have drivers for your board. If the package you own does not have drivers for the board, please fax or e-mail the package name and the revision number from the install disks. We will research the package for you and advise how to obtain drivers.

Some application drivers are included with the Universal Library package, but not with the application package. If you have purchased an application package directly from the software vendor, you may need to purchase our Universal Library and drivers. Please contact us by phone, fax or e-mail:

- Phone: 203-483-9966 and follow the instructions for reaching Tech Support.
- Fax: 203-483-9024 to the attention of Tech Support
- Email: techsupport@cyberresearch.com

Register-level programming

You should use the Universal Library or one of the packaged application programs mentioned above to control your board. Only experienced programmers should try register-level programming. If you need to program at the register level in your application, refer to the *Register Map for the CYDAS 16JRHRU.*

Functional Details

The CYDAS 16JRHRU provides the following features:

- Eight differential or 16 single-ended 16-bit analog inputs
- Eight high current digital I/O channels
- Three 16-bit down counters

The block diagram shown here illustrates the functionality of the CYDAS 16JRHRU.

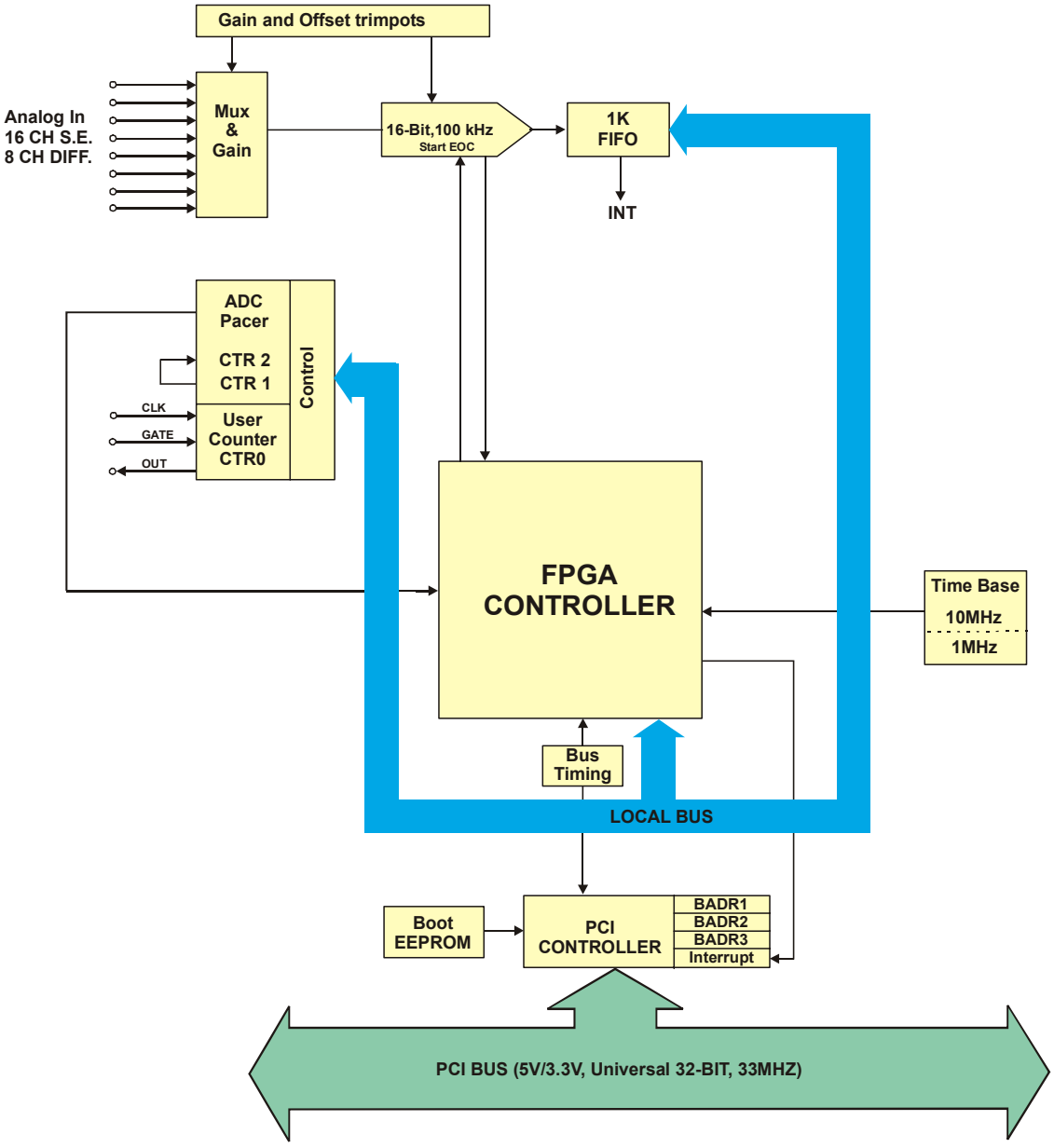


Figure 4-1. CYDAS 16JRHRU block diagram

Analog inputs

The analog input mode is switch-selectable for eight differential or 16 single-ended analog inputs. The board offers a 100 kHz maximum sample rate in single and multi-channel scans at any gain setting. A 1024 sample FIFO assures that data taken from the board is transferred into computer memory without the possibility of missed samples. The board has a digital trigger input with software-selectable trigger edge.

Software selects the bipolar/unipolar input configuration and input range. Table 4-1 lists the analog input ranges and resolutions for the available input configurations and gains.

Table 4-1. Input range and resolution

Bipolar Range	Resolution	Unipolar Range	Resolution
±10 V	305 µV	0 to 10 V	153 µV
±5 V	153 µV	0 to 5 V	76.3 µV
±2.5 V	76.3 µV	0 to 2.5 V	38.1 µV
±1.25 V	38.1 µV	0 to 1.25 V	19.1 µV

Burst mode

Channel-to-channel skew results from multiplexing the A/D inputs. Channel skew is defined as the time between consecutive samples. For example, if four channels are sampled at a rate of 1 kHz per channel, the channel skew is 250 µs (1 ms/4).

Burst mode minimizes channel-to-channel skew by clocking the A/D at the maximum rate between successive channels. At the 1-ms pulse, channel 0 is sampled. After 10 µs, channel 1 is sampled. Channel 2 is sampled 10 µs after channel 1 is sampled. Channel 3 is sampled 10 µs after channel 2 is sampled. No samples are then taken until the next 1-ms pulse, when channel 0 is sampled again. In this mode, the rate for all channels is 1 kHz, but the channel-to-channel skew (delay) is now 10 µs. The minimum burst mode skew/delay on this board is 10 µs (refer to Figure 4-2).

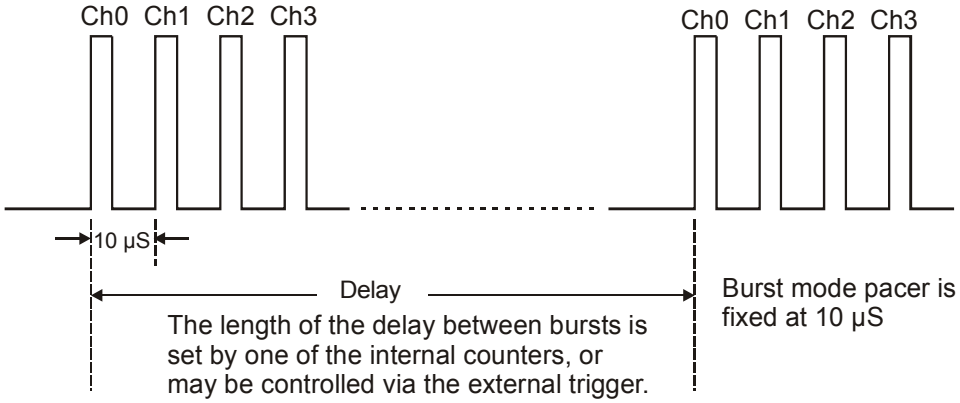

Ch0 Ch1 Ch2 Ch3
Ch0 Ch1 Ch2 Ch3
10 µS
Delay
The length of the delay between bursts is set by one of the internal counters, or may be controlled via the external trigger.
Burst mode pacer is fixed at 10 µS

Figure 4-2. Burst mode timing

Digital I/O

Eight TTL-compatible digital I/O channels are available on the main I/O connector. Four of the digital channels are configured as input. The remaining four are configured as output.

Counter/timer I/O

The CYDAS 16JRHRU provides an 82C54 counter chip. This chip contains three 16-bit down counters that provide clock, gate, and output connections. You can connect the counter clock to the on-board 10 MHz crystal oscillator, or leave the counter clock unconnected for user input.

Calibrating the CYDAS 16JRHRU

The CYDAS 16JRHRU is shipped fully calibrated from the factory. For normal environments, you should calibrate your CYDAS 16JRHRU board using *Insta*Cal's calibration procedures every six months-to-a year. If frequent variations in temperature or humidity are common, recalibrate at least every three months. It requires less than 20 minutes to calibrate the board using *Insta*Cal.

Calibrating the A/D and D/A converters

*Insta*Cal provides step-by-step on-screen instructions to guide you in calibrating your board. You calibrate the board's A/D converters by applying a known voltage to an analog input channel and adjusting the board's trim pots for offset and gain.

Calibrate the CYDAS 16JRHRU for the range you intend to use it in. Slight variations in zero and full scale may result when the range is changed. These variations can be measured and removed in software, if necessary.

Required equipment

To calibrate the CYDAS 16JRHRU, you need a precision voltage source, or a non-precision source and a 5½ digit digital voltmeter and a few pieces of wire. Use a jeweler's screwdriver to adjust the trim pots. An extender card is not required to calibrate the board.

Specifications

Typical for 25 °C unless otherwise specified.

Specifications in *italic text* are guaranteed by design.

Power consumption

+5V quiescent	500 mA typical, 750 mA max. Does not include the current consumed through 37-pin I/O connector.
+5V available at 37-pin I/O connector	1 A max, protected with re-settable fuse

Analog input

A/D converter type	LTC1605ACSW
Resolution	16 bits
Number of channels	16 single-ended / 8 differential, switch selectable
Input ranges ▪ Gain is software selectable ▪ Unipolar / bipolar polarity is software selectable	±10 V, ±5 V, ±2.5 V, ±1.25 V 0 to 10 V, 0 to 5 V, 0 to 2.5 V, 0 to 1.25 V
A/D Pacing (software programmable)	Internal counter - 82C54. Positive or negative edge, jumper selectable.
	External source (pin 25), Positive or negative edge, software selectable.
	Software polled
A/D Trigger (only available when internal pacing selected, software enable/disable)	External edge trigger (pin 25), Positive or negative edge, software selectable.
A/D Gate (only available when internal pacing selected, software enable/disable)	External gate (pin 25), High or Low level, software selectable.
Simultaneous Sample and Hold trigger	TTL output (pin 26) Logic 0 = Hold, Logic 1 = Sample Compatible with CYSSH 16
Burst mode	Software selectable option, burst interval = 10 µS
Data transfer	From 1024 sample FIFO via interrupt w/ REPINSW
	Interrupt
	Software polled
Interrupt	INTA# - mapped to IRQn via PCI BIOS at boot-time
Interrupt enable	Programmable through PLX9030
Interrupt polarity	Active high level or active low level, programmable through PLX9030
Interrupt sources (software programmable)	▪ End of conversion ▪ FIFO not Empty ▪ End of Burst ▪ End of Acquisition ▪ FIFO Half Full
A/D conversion time	*10 µs max.*
Throughput	100 kS/s
Input coupling	*DC*
Input bandwidth (all ranges)	*325 kHz*
Common mode range	±10 V min.
CMRR @ 60 Hz	-100 dB typ., -80 dB min
Recommended warm-up time	15 minutes
Input bias current	*±3 nA max.*
Input impedance	*10 M Ohms min.*
Absolute maximum input voltage	*+55/-40V fault protected via input mux.*

Accuracy

Typical accuracy	±2.3 LSB
Absolute accuracy	±5.0 LSB
Accuracy components	
Gain Error	Trimmable by potentiometer to 0
Offset Error	Trimmable by potentiometer to 0
PGA linearity error	*±1.3 LSB typ., ±10.0 LSB max.*
Integral Linearity Error	±0.5 LSB typ., ±3.0 LSB max.
Differential Linearity Error	*±0.5 LSB typ., ±2.0 LSB max.*

Each CYDAS 16JRHRU is tested at the factory to ensure the board's overall accuracy error does not exceed ±5 LSB. Total board error is a combination of gain, offset, differential linearity and integral linearity error. The theoretical absolute accuracy of the board may be calculated by summing these component errors. Worst case error is realized only in the unlikely event that each of the component errors are at their maximum level, and causing error in the same direction.

Analog input drift

Range	Analog Input Full-Scale Gain drift	Analog Input Zero drift	Overall Analog Input drift
±10.00 V	2.2 LSB/°C max.	1.8 LSB/°C max.	4.0 LSB/°C max.
±5.000 V	2.2 LSB/°C max.	1.9 LSB/°C max.	4.1 LSB/°C max.
±2.500 V	2.2 LSB/°C max.	2.0 LSB/°C max.	4.2 LSB/°C max.
±1.250 V	2.2 LSB/°C max.	2.3 LSB/°C max.	4.5 LSB/°C max.
0 - 10.00 V	4.1 LSB/°C max.	1.9 LSB/°C max.	6.0 LSB/°C max.
0 - 5.000 V	4.1 LSB/°C max.	2.1 LSB/°C max.	6.2 LSB/°C max.
0 - 2.500 V	4.1 LSB/°C max.	2.4 LSB/°C max.	6.5 LSB/°C max.
0 - 1.250 V	4.1 LSB/°C max.	3.0 LSB/°C max.	7.1 LSB/°C max.

Absolute error change per °C temperature change is a combination of the gain and offset drift of many components. The theoretical worst case error of the board may be calculated by summing these component errors. Worst case error is realized only in the unlikely event that each of the component errors are at their maximum level, and are causing error in the same direction.

Noise performance

The following table summarizes the worst case noise performance for the CYDAS 16JRHRU. Noise distribution is determined by gathering 50000 samples with inputs tied to ground at the CYDAS 16JRHRU main connector. Data represents both single-ended and differential modes of operation.

Range	LSBrms	Typical Counts
±10.00 V	1.30	12
±5.000 V	1.30	12
±2.500 V	1.30	12
±1.250 V	1.30	13
0 - 10.00 V	1.80	15
0 - 5.000 V	1.80	15
0 - 2.500 V	1.80	15
0 - 1.250 V	1.80	16

Settling time

Settling time is defined here as the time required for a channel to settle to within a specified accuracy in response to a full-scale (FS) step. Two channels are scanned at a specified rate with a –FS DC signal presented to channel 1 and a +FS DC signal presented to channel 0.

Condition	Range	Accuracy			
			±0.00076% (±4 LSB)	±0.0015% (±8 LSB)	±0.0061% (±16 LSB)
Same range to same range	±10 V	Typ.	400 µS	100 µS	10 µS
	±5 V	Typ.	100 µS	20 µS	10 µS
	±2.5 V	Typ.	60 µS	12 µS	10 µS
	±1.25 V	Typ.	50 µS	10 µS	
	0 to 10 V	Typ.	400 µS	100 µS	10 µS
	0 to 5 V	Typ.	100 µS	20 µS	10 µS
	0 to 2 V	Typ.	60 µS	12 µS	10 µS
	0 to 1.25 V	Typ.	50 µS	10 µS	

Digital input / output

Main connector

Digital output type	5V/TTL compatible
Digital input type	5V/TTL compatible, pulled to logic high via 10 K resistor network
Number of I/O	8
Configuration	4 fixed input, 4 fixed output
Output high voltage	*3.8 volts min. @ -32 mA*
Output low voltage	*0.55 volts max. @ 32 mA*
Input high voltage	*2.0 volts min., 7 volts absolute max.*
Input low voltage	*0.8 volts max., -0.5 volts absolute min.*
Data transfer	Programmed I/O
Power-up / reset state	DIG OUT [3:0] - TTL logic low state

Counter

Counter type	82C54
Configuration	3 down counters, 16-bits each
Counter 1 source (software selectable)	▪ External source from main connector (pin 21*) ▪ 100 kHz internal source
Counter 1 gate	External gate from main connector (pin 24*)
Counter 1 output	Available at main connector (pin 2)
Counter 2 source (jumper selectable at P2)	▪ Internal 1 MHz ▪ Internal 10 MHz
Counter 2 gate (software enable/disable)	External source from main connector (pin 25*)
Counter 2 output	Internal only, chained to counter 3 source
Counter 3 source	Counter 2 output
Counter 3 gate (software enable/disable)	External source from main connector (pin 25*)
Counter 3 output	Available at main connector (pin 20). Programmable as ADC Pacer clock.
Clock input frequency	*10 MHz max.*
High pulse width (clock input)	*30 ns min.*
Low pulse width (clock input)	*50 ns min.*
Gate width high	*50 ns min.*
Gate width low	*50 ns min.*
Input high	*2.0 volts min., 5.5 volts absolute max.*
Input low	*0.8 volts max., -0.5 volts absolute min.*
Output high	*3.0 volts min. @ -2.5 mA*
Output low	*0.4 volts max. @ 2.5 mA*
Crystal oscillator frequency	10 MHz
Frequency accuracy	50 ppm

* Pins 21, 24, and 25 are pulled to logic high via 10 K resistors.

Environmental

Operating temperature range	0 to 70 °C
Storage temperature range	-40 to 100 °C
Humidity	0 to 95% non-condensing

Mechanical

Card dimensions	PCI half card: 136.5 mm (L) x 106.9 mm (W) x 11.65 mm (H)
Form factor	Universal PCI keying. Compatible with 3.3 V/5 V 32-bit, 33 MHz back planes.

Main connector and pin out

Connector type	37-pin male "D" connector
Connector compatibility	Identical to the CYDAS 16JRHR connector
Compatible accessory products	CYSTP 37 CYSSH 16
Compatible cables	CBL 37xx CBL 37xxFS

8-channel differential mode pin out

Pin	Signal Name	Pin	Signal Name
1	+5V PC BUS POWER	20	CTR 3 OUT
2	CTR 1 OUT	21	CTR 1 CLOCK IN
3	DIG OUT 3	22	DIG OUT 2
4	DIG OUT 1	23	DIG OUT 0
5	DIG IN 3	24	DIG IN 2 / CTR1 GATE
6	DIG IN 1	25	DIG IN 0 / EXT TRIG / EXT PACER / EXT GATE
7	DIG GND	26	SS&H OUT
8	NC	27	NC
9	NC	28	AGND
10	NC	29	AGND
11	CH7 LO	30	CH7 HIGH
12	CH6 LO	31	CH6 HIGH
13	CH5 LO	32	CH5 HIGH
14	CH4 LO	33	CH4 HIGH
15	CH3 LO	34	CH3 HIGH
16	CH2 LO	35	CH2 HIGH
17	CH1 LO	36	CH1 HIGH
18	CH0 LO	37	CH0 HIGH
19	AGND		

16-channel single-ended mode pin out

Pin	Signal Name	Pin	Signal Name
1	+5V PC BUS POWER	20	CTR 3 OUT
2	CTR 1 OUT	21	CTR 1 CLOCK IN
3	DIG OUT 3	22	DIG OUT 2
4	DIG OUT 1	23	DIG OUT 0
5	DIG IN 3	24	DIG IN 2 / CTR1 GATE
6	DIG IN 1	25	DIG IN 0 / EXT TRIG / EXT PACER / EXT GATE
7	DIG GND	26	SS&H OUT
8	NC	27	NC
9	NC	28	AGND
10	NC	29	AGND
11	CH15 HIGH	30	CH7 HIGH
12	CH14 HIGH	31	CH6 HIGH
13	CH13 HIGH	32	CH5 HIGH
14	CH12 HIGH	33	CH4 HIGH
15	CH11 HIGH	34	CH3 HIGH
16	CH10 HIGH	35	CH2 HIGH
17	CH9 HIGH	36	CH1 HIGH
18	CH8 HIGH	37	CHO HIGH
19	AGND		

CE Declaration of Conformity

Category: Electrical equipment for measurement, control and laboratory use.

The manufacturer declares under sole responsibility that the product

CYDAS 16JRHRU

to which this declaration relates is in conformity with the relevant provisions of the following standards or other documents:

EU EMC Directive 89/336/EEC: Electromagnetic Compatibility, EN55022 (1995), EN55024 (1998)

Emissions: Group 1, Class B

- EN55022 (1995): Radiated and Conducted emissions.

Immunity: EN55024

- EN61000-4-2 (1995): Electrostatic Discharge immunity, Criteria A.
- EN61000-4-3 (1997): Radiated Electromagnetic Field immunity Criteria A.
- EN61000-4-4 (1995): Electric Fast Transient Burst immunity Criteria A.
- EN61000-4-5 (1995): Surge immunity Criteria A.
- EN61000-4-6 (1996): Radio Frequency Common Mode immunity Criteria A.
- EN61000-4-8 (1994): Power Frequency Magnetic Field immunity Criteria A.
- EN61000-4-11 (1994): Voltage Dip and Interrupt immunity Criteria A.

Declaration of Conformity based on tests conducted by Chomerics Test Services, Woburn, MA 01801, USA in September, 2001.

We hereby declare that the equipment specified conforms to the above Directives and Standards.

Product Service

Diagnosis and Debug

CyberResearch, Inc. maintains technical support lines staffed by experienced Applications Engineers and Technicians. There is no charge to call and we will return your call promptly if it is received while our lines are busy. Most problems encountered with data acquisition products can be solved over the phone. Signal connections and programming are the two most common sources of difficulty. CyberResearch support personnel can help you solve these problems, especially if you are prepared for the call.

To ensure your call's overall success and expediency:

1) Have the phone close to the PC so you can conveniently and quickly take action that the Applications Engineer might suggest.
2) Be prepared to open your PC, remove boards, report back-switch or jumper settings, and possibly change settings before reinstalling the modules.
3) Have a volt meter handy to take measurements of the signals you are trying to measure as well as the signals on the board, module, or power supply.
4) Isolate problem areas that are not working as you expected.
5) Have the source code to the program you are having trouble with available so that preceding and prerequisite modes can be referenced and discussed.
6) Have the manual at hand. Also have the product's utility disks and any other relevant disks nearby so programs and version numbers can be checked.

Preparation will facilitate the diagnosis procedure, save you time, and avoid repeated calls. Here are a few preliminary actions you can take before you call which may solve some of the more common problems:

1) Check the PC-bus power and any power supply signals.
2) Check the voltage level of the signal between SIGNAL HIGH and SIGNAL LOW, or SIGNAL+ and SIGNAL– . It CANNOT exceed the full scale range of the board.
3) Check the other boards in your PC or modules on the network for address and interrupt conflicts.
4) Refer to the example programs as a baseline for comparing code.

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Warranty Notice

CyberResearch, Inc. warrants that this equipment as furnished will be free from defects in material and workmanship for a period of one year from the confirmed date of purchase by the original buyer and that upon written notice of any such defect, CyberResearch, Inc. will, at its option, repair or replace the defective item under the terms of this warranty, subject to the provisions and specific exclusions listed herein.

This warranty shall not apply to equipment that has been previously repaired or altered outside our plant in any way which may, in the judgment of the manufacturer, affect its reliability. Nor will it apply if the equipment has been used in a manner exceeding or inconsistent with its specifications or if the serial number has been removed.

CyberResearch, Inc. does not assume any liability for consequential damages as a result from our products uses, and in any event our liability shall not exceed the original selling price of the equipment.

The equipment warranty shall constitute the sole and exclusive remedy of any Buyer of Seller equipment and the sole and exclusive liability of the Seller, its successors or assigns, in connection with equipment purchased and in lieu of all other warranties expressed implied or statutory, including, but not limited to, any implied warranty of merchant ability or fitness and all other obligations or liabilities of seller, its successors or assigns.

The equipment must be returned postage prepaid. Package it securely and insure it. You will be charged for parts and labor if the warranty period has expired.

Returns and RMAs

If a CyberResearch product has been diagnosed as being non-functional, is visibly damaged, or must be returned for any other reason, please call for an assigned RMA number. The RMA number is a key piece of information that lets us track and process returned merchandise with the fastest possible turnaround time.

PLEASE CALL FOR AN RMA NUMBER!

Packages returned without an RMA number will be refused!

In most cases, a returned package will be refused at the receiving dock if its contents are not known. The RMA number allows us to reference the history of returned products and determine if they are meeting your application's requirements. When you call customer service for your RMA number, you will be asked to provide information about the product you are returning, your address, and a contact person at your organization.

Please make sure that the RMA number is prominently displayed on the outside of the box.

• Thank You •

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CyberResearch, Inc.
25 Business Park Drive
Branford, CT 06405 USA
P: (203) 483-8815; F: (203) 483-9024
www.cyberresearch.com